

PATENT SPECIFICATION

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DRAWINGS ATTACHED.

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COMPLETE SPECIFICATION.

Improvements in Devices for Circulating and Aerating Aquarium Water.

- We, ERWIN KOLFERTZ, a Kommanditgesellschaft, organised under the laws of Germany, of Turnerstrasse 22, Solingen-Merscheid, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—
- 10 This invention relates to devices for circulating, and introducing air into, aquarium water. Water charged with air is required in particular in aquariums because the aquarium water, be it fresh or salt, needs to be enriched constantly with oxygen. An adequate aeration of the water, combined with continuous cleaning, is necessary in the maintenance of aquarium fishes and water-plants.
- 15 The aquarium water is usually purified by continuous circulation through a pump which sucks the water through a purifying filter bed consisting for example of polyamide wool, activated carbon and gravel. The purified water is then returned to the aquarium. After the water has been sucked up from the bottom of the aquarium and filtered, it is known to enrich it with oxygen by introducing air under pressure through an air pipe into a pipe conveying the filtered water.
- 20 However this method requires the use of a separable air pump, which compresses the air enough to overcome the water pressure in the filtered water pipe, the air entering the filtered water in the form of numerous individual bubbles. The air pumps available for this purpose are both expensive and undesirably noisy, and they take up extra space. This is particularly inconvenient for example in the case of an aquarium which
- is a permanent fixture, for example let into a bookcase.
- The object of the present invention is therefore to avoid these disadvantages and in particular to provide a device for circulating, and introducing air into aquarium water, without it being necessary to use a separate air pump, and yet providing adequate aeration of the water.
- To this end according to this invention, such a device comprises a water pump having a suction connection fitted with a filter pot, and a delivery connection, and an air inlet pipe having one end open to the atmosphere and the other end projecting into the interior of one of the pump connections to form a constriction in this connection so that, when the pump is in operation, a Venturi effect is set up across the constriction which produces a pressure below atmospheric in the air inlet pipe so that air is drawn through it into the pump connection.
- In this way the water sucked in or delivered by the pump is enriched continuously with air, the rate of flow of air depending on the velocity of the water stream, so that from the delivery outlet of the pump there issues a well-balanced water-air mixture.
- To provide a means for controlling the air flow from zero flow up to the maximum flow corresponding to the velocity of the stream of water, the air inlet pipe may be provided with a valve to restrict its flow area.
- Both the suction connection and the delivery connection of the pump may be equipped with air connections and in this case the air sucked in at the suction connection becomes dispersed into very fine bubbles, whereas the air entering the delivery

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connection appears in the form of comparatively large bubbles.

Particular advantages accrue if the device consists of a centrifugal pump the suction connection of which is connected to a filter pot and also to an air pipe the free end of which is connected to a control valve. In this example of the invention the air sucked in enters the water at the outlet of the filter pot. The water-air mixture then passes through the centrifugal pump, whose impeller disperses the air into very fine bubbles, giving an optimum enrichment with oxygen. The device according to the invention is particularly suitable for sea-water aquaria, because this kind of water favours the formation of a very fine dispersion of air in it.

An example of a device constructed in accordance with the invention is illustrated in the accompanying drawings in which:—

Figure 1 is a vertical section through the device;

Figure 2 is a horizontal section along the line II—II in Figure 1.

The device comprises a motor 3 having a shaft connected by a flexible sleeve 4 to an impeller 5 of a centrifugal water pump 6. The motor 3 is mounted on a plate 7 which is connected by support members 8 to the housing of the centrifugal pump 6.

The pump housing has a delivery connection 9 and a suction connection being connected to a filter pot 12, which contains a filter bed consisting of gravel, wood charcoal and polyamide wool. The filter pot 12 has a bottom containing holes 14 for entry of the soiled aquarium water.

An air pipe 15 is connected to the suction connection 11 of the centrifugal pump 6. One end of the pipe 15 projects inwards somewhat into the interior of the suction connection 11. The other end of the air pipe 15 is connected to a pipe 16, which contains a control valve 17 for varying the local internal cross-sectional area of the pipe 16 and thus controlling the flow of air passing through the air pipe 15 into the suction connection 11 of the pump.

Under the influence of the suction produced in the suction connection 11 by the impeller 5 the soiled water from the aquarium passes upwards through the filter

pot 12 and, passing upwards through the suction connection 11, entrains a stream of air through the air connection 15, the rate of flow of air depending on the rate of flow of water through the suction connection 11 past the end of the pipe 15 which forms a constriction and thus produces a Venturi effect, and on the degree of suction produced by the centrifugal pump 6, and also on the setting of the control valve 17. The air thus entrained is finely dispersed in the water by the impeller 5 so that a stream of filtered water containing finely dispersed air bubbles issues from the delivery connection 9. The flow of air can be controlled to suit existing requirements by manipulating the control valve 17.

WHAT WE CLAIM IS:—

1. A device for circulating, and introducing air into, aquarium water, the device comprising a water pump having a suction connection fitted with a filter pot, and a delivery connection, and an air inlet pipe having one end open to the atmosphere and the other end projecting into the interior of one of the pump connections to form a constriction in this connection so that, when the pump is in operation, a Venturi effect is set up across the constriction which produces a pressure below atmospheric in the air inlet pipe so that air is drawn through it into the pump connection.

2. A device according to Claim 1, in which the air inlet pipe communicates with the pump suction connection.

3. A device according to any one of the preceding claims, in which the air inlet pipe is provided with a valve to restrict its flow area and thus control the flow of air through it.

4. A device according to any one of the preceding claims, in which the pump is of the centrifugal type.

5. A device according to Claim 1, constructed substantially as described with reference to the accompanying drawings.

For the Applicants:
GILL, JENNINGS & EVERY,
Chartered Patent Agents,
51/52 Chancery Lane,
London, W.C.2.

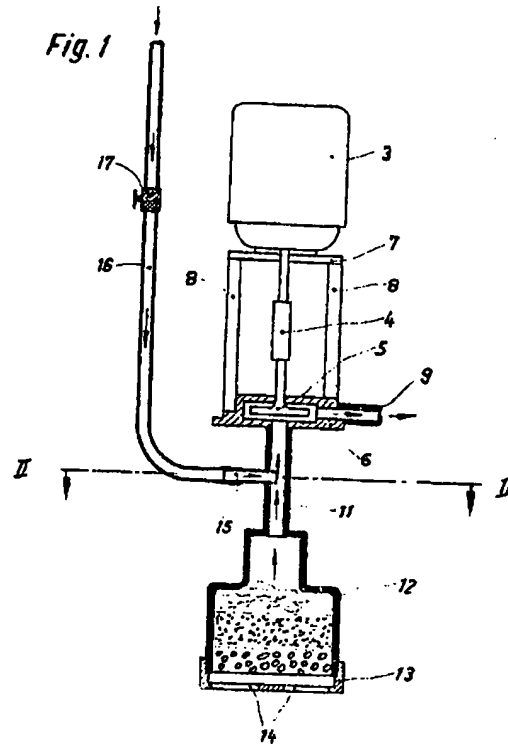


Fig. 2

